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## ENTERPRISE, ENTREPRENEURSHIP, AND INNOVATION: WHAT THIS MEANS FOR THE NEW HRM PROFESSIONAL AND THE NEW WORKPLACE

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### Abstract

*With the fourth industrial revolution underway, this paper suggests that one way of responding to the changing way we work is for HRM professionals to develop a deeper and broader understanding of enterprising, entrepreneurial, and innovative behaviors. The paper provides an overview of the changes that are beginning to occur as a result of this revolution and describes what these changes mean to employment. The paper examines the emerging skills needed for the future and argues that many if not all of these skills can be met by matching them to the competencies that make enterprising, entrepreneurial and innovative people successful. The paper looks at the implications for HRM professionals and concludes that a deeper and broader understanding of enterprising, entrepreneurial, and innovative behaviors will be critical for HRM professionals as the nature of work changes.*

**Keywords:** industrial revolution, enterprise, entrepreneurship, innovation, work change

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### 1. INTRODUCTION

There is little disagreement that we have entered the fourth industrial revolution (Bloem et al., 2014; Peters, 2017; Schwab, 2017; Xu, David, and Kim, 2018). Industrial revolutions are mostly defined as shifts in the sources and control of power from the human hand to mechanical means (Stearns, 2018; Wrigley, 2013). Moving from using water and steam as power sources to manufacture goods in the first industrial revolution, through the second industrial revolution that saw the use of electricity as a source of power, to the third revolution that heralded the use of electronics and IT to automate production (Xu, David, and Kim, 2018; Prisecaru, 2016), we have seen wider and greater shifts in the sources and control of power away from the human hand. Looking back, we can see that the previous

three industrial revolutions focused on automating those tasks that were easily replicated by machines. Those tasks that are not easily replicated by machines, such as persuasion, innovation, and creativity, or certain manual tasks that require specific individualized outcomes, such as cooking a specific meal or dressing the disabled, are harder to automate (Autor, Levy and Murnane, 2003). Furthermore, many tasks that were undertaken to produce goods and services in the first three revolutions relied primarily on the body of the worker (Xu, David and Kim, 2018). The fourth industrial revolution is very different.

The main difference is that the fourth industrial revolution involves the use of artificial intelligence and machine learning, as well as new sources of power, such as renewable energy, in the manufacture of products and the delivery of services (Prise-

caru, 2016; Schwab, 2017). Like previous industrial revolutions, this revolution will precipitate change, but on a scale not seen before (Xu, David, and Kim, 2018). We can draw comparisons between acceleration of the first three industrial revolutions and the fourth industrial revolution. Roughly between the year 1500 and the year 2000, productivity rose by a factor of 240 and the consumption of energy rose by a factor of 115 (Harari, 2014) as a result of the first three industrial revolutions. The velocity of change between each industrial revolution has become faster and faster over a period of 500 years. The rate of change brought by the fourth industrial revolution is anyone's guess, but if the first three are any guide, we can expect to see the way we live changing in the space of decades rather than generations or centuries.

The fourth industrial revolution has seen a move toward the use of the mind (Xu, David and Kim, 2018). It now seems that many of the tasks previously considered impossible to replicate through automation are in fact being automated (Kokkohen, 2017), even some of those tasks using the mind. Many people have explored what this means for the future of work and the way we work. Consequently, there is a wide range of views about what all of this means. This paper explores what the fourth industrial revolution means to way we work and live. It then considers the possible changes to the types of skills that will become predominant. The impact of these new skills on Human Resource Management (HRM) activities at a practical level is identified. The paper ends with some conclusions about what this means for the future of HRM, and why enterprising, entrepreneurial, and innovative behaviors are critical skills for future employees.

## **2. THEORETICAL BACKGROUND**

### **2.1 The fourth industrial revolution and its consequences**

There is a plethora of contrasting views about what the fourth industrial revolution means. These views range from the apocalyptic to the genesis of a bright new future (Brynjolfsson and MacAfee, 2014; Carboni 2017; Pupillo, Noam, and Waverman, 2018). At one end is the view that this revolution

brings the threat of mass unemployment, social disruption, and widespread poverty because this time robots will replace humans, and opposing this view is the belief it will create new and more jobs than ever before while providing an improved quality of life (ibid).

Using various scenarios, Hajkowicz et al. (2016) painted a picture of what work would be like in 20 years' time. Their vision is one of automation, with workers undertaking fine control of the machines (Hajkowicz, et al 2016). The implication is that most human employment will be as guardians of the robots by undertaking the more delicate activities that the robots are unable to perform. In another scenario, Brynjolfsson and MacAfee (2014) considered a darker picture, in which those who own the AI and robots seize all the economic value created, and those with just their labor to sell will have nothing because their labor has no value. A version of this prediction can be seen with social media, in which organizations such as Facebook generate huge profits and yet produce none of the content. Those who do produce the content get no reward for making Facebook so profitable. Furthermore, as with all industrial revolutions, some will lose their occupations and not substitute them with alternative occupations, but the majority of people will move on (Bakhshi et al., 2017). It is likely that rather than all forms of employment disappearing, most people will simply retrain to take on new occupations.

One of the most widely quoted views of the impact of the fourth industrial revolution on employment is that of Frey and Osbourne (2017), who researched the degree of susceptibility to computerization of over 700 occupations in the USA. They argued that about 47% of jobs were susceptible to various levels of computerization or automation (Frey and Osbourne, 2017). This has led to some taking a negative view. However, they demonstrated that throughout history, technical change in the way people work causes a shift in work patterns rather than leading to mass unemployment (ibid). What happened previously was that most people changed what they did as new jobs were invented or existing jobs needed new tasks (Lee, Huang, and Ashford, 2018; van Kruining, 2017). It was inevitable that some people were left behind (Bakhshi et al., 2017).

On a more positive note, a more recent study by Arntz, Gregory, and Zierahn (2016) took a very different view from that of Frey and Osbourne, arguing that just 9% of jobs are susceptible to computerization. However, this is due to two very different methodologies being used. Frey and Osbourne (2017) looked at jobs overall, whereas Arntz, Gregory, and Zierahn (2017) focused on tasks performed within various jobs. Both the Frey and Osbourne and Arntz, Gregory, and Zierahn studies are instructive for this paper. This is because the causes and range of the changes to the way people work extends beyond artificial intelligence and machine learning. MacCory et al. (2014) indicated that a small number of variables are unable to identify all the permutations that affect potential automation of work, something neither paper looked at in depth.

Artificial intelligence and machine learning are not the only factors that are changing the way we work. One of most noticeable factors is globalization (Pupillo, Noam, and Waverman, 2018). Harari (2014) discussed how we have evolved into a global community in which mutual support and integration on a global scale, as opposed to a local community scale, is becoming embedded in our lives. Evidence of this can be found in the rise of integrated labor markets in which people in different geographical locations work together (Bakhshi et al., 2017; De Stefano, 2015; Hecklau et al., 2016). This, alongside rising protectionism and shifting national alliances such as the recent referendum in the UK to leave the EU (Farrell, and Newman, 2017), has impacted how we work. The exit of the UK from the EU would see the global opportunities for employment diminish for some British people. Rising inequality in education, health, wealth consumption, and power (Colen, Krueger, and Boettner, 2018; Goldin, and Katz, 2018) also contributes to the change in the way we work. Among the concerns about inequality is the diversion of resources to a chosen few, leading to the loss of confidence in state and social institutions (Dabla-Norris et al., 2015) and possible increased social tension (Wolf, 2015). The demand for sustainable living conditions that take into consideration eco-friendly lifestyles that address concepts such as pollution impact the way we work (Safronova, Nezhnikova, and Kolhidov, 2017). Even demographic shifts such as the 50% of the popula-

tion of the world now living in urban locations and the declining birth rates and aging populations (Bloom et al., 2015; Ritchie, and Roser, 2018) are impinging on the tasks we perform in our occupations and are contributing to a growing range of new occupations.

As with previous industrial revolutions, this one brings change not only to the way people work, but also to the way we live. As living conditions change, and a new world emerges. Tied in to this are changes in the way businesses operate, creating new work spaces.

## 2.2 The new workplace

One outcome of this industrial revolution is that it is creating new ways of conducting business at a much faster rate than before. The world's biggest hotelier, with five times as many beds available as the next five hotel groups combined, is Airbnb (Wood, 2017). They had a turnover of \$5.5b in 2017, and yet they do not own a single bedroom and employ just 3,100 people (Forbes, 2018). Two of the five biggest online retailers are Etsy and eBay (Tyler, 2018). In 2017, Etsy had an annual turnover of \$441m and employed around 800 people (Statista, 2018). eBay turned over \$38b in 2017 and employed around 14,000 (Statista, 2018). Yet neither Etsy nor eBay carry any stock or products (Forbes, 2018). One of the biggest logistics companies in the world, mainly transporting people, is Uber. Uber has an annual turnover of \$7b and employs around 16,000 people. Like Airbnb, Etsy, and eBay, they too do not own the infrastructure required to operate their businesses—Uber does not have any vehicles (Goodwin, 2015). These are just some of more widely known new ways of doing business. The impact of this method is that we in many ways we are becoming the supplier, employer, employee, and consumer all at the same time. In other words, many of us are becoming the creators of our own employment, and this is not being restricted to the self-employment model of the likes of Airbnb, Etsy, eBay, or Uber. These changes to the structure and methods of doing business mean that the workplace, the relationships within the workplace, and the activities we do are all moving in a new direction as well.

One of the most profound changes to the workplace is the appearance of the gig economy (Abraham et al., 2018; Petriglieri, Ashford, and Wrzesniewski, 2018). The gig economy falls into two broad categories. One, known as crowdsourcing or crowdwork, involves outsourcing work over the internet to a group of people spread across a variety of locations, often with a diverse range of skills (Bergvall-Kåreborn and Howcroft, 2014; De Stefano, 2015). With crowdwork the participants generally pool their labor to work on the same task. The other version of work in the gig economy is known as work-on-demand, in which individuals sometimes bid for a single specific task such as delivery of low-scale clerical work or the transportation of people (De Stefano, 2015, Greenhouse, 2015). As a consequence, the workplace is more transparent, flatter, more competitive, and on-demand (Johannessen, 2018). It is more transparent because workers announce when they are available for work, and their work is visible and measurable most of the time. The structure is becoming flatter, because the distinction between personal and work space is disappearing, with responsibility for the quality and completion of the task lying with the worker. The tendering process of the gig economy is making work more competitive; the best and cheapest will get the gigs. Work is also becoming on-demand; work will be available and can be completed any time, any day.

The gig economy is not the only significant change in the way we work. Taylor et al. (2017) identified a number of other trends that show that the work place is changing. Both part-time work and self-employment have been on the rise, whereas on-demand employment through zero hours contracts has also grown (Taylor et al., 2017). This suggests that whereas the number of people holding multiple jobs has fallen, the number of people undertaking casual work through platforms such as eBay and Airbnb has risen (Taylor et al., 2017). This may be because people do not consider the gig economy, in which they are self-employed, as holding an additional job. Taylor et al. (2017) supported this suggestion by arguing that in fact a number of people who are earning an income are doing so from multiple sources, and this is increasing. Some of this income is likely to be through the platform economy such as Airbnb, eBay, Etsy, or Uber.

As a result, this demand for new skills and abilities with the labor market could be morphing into a two-tier structure. It has been suggested that the evolving labor market will contain either low-skilled and low-paid jobs or high-skilled and high-paid jobs, with very few jobs in the middle. Furthermore, many current high-skill jobs such as airline pilots and financial analysts could be downgraded to lower-skilled jobs as AI and machine learning takes over (Acemoglu and Restrepo, 2017; Beaudry, Green and Sand, 2016; Frey and Osborne, 2017; Schwab, 2015).

All industrial revolutions require a shift in the skills needed to perform the various tasks necessary to undertake employment. Essentially, the first three industrial revolutions led to the organization of work around the demands of the machines, and consequently our work skills have been determined by the machinery available at the time (Martin, 2017). This is because in the first three industrial revolutions, the changes to the way people worked were focused on routine tasks, leading to demand in higher cognitive and manual skills (Deming, 2017). The fourth industrial revolution is leading to more and more routine tasks being automated. In fact, there is evidence that routine cognitive and manual tasks are being replaced by non-routine cognitive and manual tasks as AI and machine learning increase in sophistication and popularity (Autor, Levy and Murnane, 2003; Reimers, and Chung, 2019). There are growing indications that soft or social skills are becoming critical requirements over and above cognitive and manual skills (Chillas, Marks, and Galloway, 2015; Deming, 2017; Heckman, and Kautz, 2012; Hurrell, 2016). This is because the increased non-routine cognitive and manual tasks involve complex thinking and high-level communication skills (Levy and Murnane, 2005; Reimers, and Chung, 2019). The demand for skills such as problem solving, creativity, and social influence is clearly growing.

The decline of routine cognitive and manual skills is visible across a wide spectrum of occupations (Neubert et al., 2015). Taking an airline pilot as an example, the skills required to fly an airplane do not change with each flight beyond some minor local conditions. Once the pilot has mastered the core skills needed to fly the airplane, it becomes routine both cognitively and manually. However, although most people would resist flying in an airplane without a pilot, because of technology the majority of planes today are capable



of flying without a pilot (Lerner, 2017). This is because technology has taken over most of the routine cognitive and manual tasks that pilots normally undertook to fly a plane. There are many other examples of changes to skills. The skills required of a chef have changed over the past 100 years because technological change has seen an increase in labor-saving devices and pre-prepared food items, thus reducing the cutting and cooking skills of many chefs. Within the authors' lifetimes there have been substantial changes to the skills and tasks performed by retail pharmacists. As a child, one author experienced retail pharmacists dispensing advice and preparing medicines either on their own basis or based on a doctor's prescription. Today, they simply put a label on a packet of tablets. The most critical routine cognitive and manual skill of a pharmacist today is the ability to read labels and stick them on the right box, meaning that the pharmacist's skill in preparing medicines accurately and their knowledge of chemicals is greatly reduced. However, they are still required to undertake three to four years of higher education study. In the past 10 years, many new occupations, such as social media managers, sustainability manager, and drone pilots, have emerged, while many others, such as fitters and turners, machine setters, telephone operators, and typists, have either already disappeared or are declining rapidly. Clearly, skills and abilities change or disappear as new ways of working emerge, and new skills and abilities are needed, but people continue to be employed.

Over time, the nature of these skills has evolved, and many different researchers have explored the changes to the way we work (Bakhshi et al., 2017). Davies, Fidler, and Gorbis (2011) came up with a list of 10 skills that would be needed by 2020. These included concepts such as sense making, design mindset, social intelligence, and novel and adaptive thinking (Davies, Fidler, and Gorbis, 2011), all skills that are difficult for AI or machine learning to replicate. Following Davies, Fidler, and Gorbis, a number of other commentators have agreed and added their own views on which future skills will be needed to survive the fourth industrial revolution, resulting in a glut of reports on future skills. Liu and Grusky (2013) developed an eight-factor framework for examining skills needed for future employment: verbal, quantitative, analytical, creative, computer, science and en-

gineering, managerial, and nurturing. Building on Davies, Fidler, and Gorbis (2011) Thijs, Fisser, and van der Hoeven (2014) produced a list of eight critical skills that they felt were necessary. In addition to social skills, they included creativity, critical thinking, and problem-solving skills (Thijs, Fisser, and van der Hoeven, 2014). More recently, Bakhshi et al. (2017) examined 120 different skills and ranked them in order of importance. Although there were differences between the lists for the USA and the UK, there were similarities to previous studies, with originality, complex problem solving, and critical thinking being in the top 10 skills (Bakhshi, 2017). The theme that emerges is that as good as artificial intelligence and machine learning is, it is not the answer to everything. Martin (2017) argued that some human intervention will always be necessary. Frey and Osborne (2017) believed that creative and social skills would be in demand. Clearly, despite Moravec's (1999) prediction that we will one day build robots that can fully replace us, a number of issues arise. Moravec argued that many of the skills that we find easy are the result of thousands of years of evolution, and therefore are much harder to reverse engineer (Moravec, 1988, Rotenberg, 2013, Yao, 2008). However, skills such as perception and imagination, which appear to be easy to humans but immensely problematic for machines, are actually skills that evolved more recently (Rotenberg, 2013). Furthermore, Madsbjerg (2017) in his somewhat controversial book argued that business leaders cannot rely solely on algorithmic intelligence, or what Madsbjerg termed thin data. This suggests that a range of non-routine cognitive skills will still be required, which can analyze and utilize what Madsbjerg (2017) termed thick data, in contrast to thin data. It is becoming clear that traditional methods of management that focus on encouraging routine cognitive and manual tasks are no longer viable (Hecklau et al., 2016). The test for fourth industrial revolution HRM professionals is to persuade employees to utilize their unique human skills for the benefit of the organization (Habracken, and Bondarouk, 2017; Shamin et al., 2016; Xu, David and Kim, 2018).

There are strong arguments that the new work environment means that many will have to create their own jobs as the age of the entrepreneur is upon us (Hajkowicz, et al 2016). However, we argue that the generation of one's own job should not be

restricted to self-employed individuals. The changes through technology, globalization, and demographics mean that many organizations will not always know exactly who or what they need. The possibility exists that the job applicant will be the one to tell the organization who they need and what tasks they need to perform. In other words, organizations could be looking to people to create their own jobs within the organization.

### 2.3 Is the development of enterprising, entrepreneurial, and innovative behaviors the answer?

In previous industrial revolutions the key factors enabling economic growth were machinery and investment; essentially, people were replaceable at far lower cost (Xu, David and Kim, 2018). In this next industrial revolution, it will be the individual's creativity and innovation that will become critical in many jobs (Audenaert, Vanderstraeten, and Buyens, 2017). The rarest commodities needed for business growth and survival will not be machinery or investors, but people with usable ideas (Brynjolfsson, McAfee, and Spence 2014). All this suggests that enterprising, entrepreneurial, and innovative behaviors are a necessity in order to contribute to the survival and growth of any organization.

There are multiple definitions of enterprising, entrepreneurial, and innovative behaviors. However, one of the most widely accepted set of definitions is that developed by The Quality Assurance Agency for Higher Education (QAA). Their educators guide, "Enterprise and entrepreneurship education: Guidance for UK higher education providers," offers succinct but detailed definitions of enterprise and entrepreneurship (see the Appendix for the full definitions). Both of these definitions focus on the fact that enterprise and entrepreneurship are sets of behaviors, and that innovation is a possible outcome of these behaviors. They include concepts such as creativity, originality, initiative, and adaptability (QAA, 2018).

Enterprising, entrepreneurial, and innovative behaviors have been seen as competencies that can be developed (Bacigalupo et al., 2016; Schmidt, 2015). Furthermore, it has been argued that these competencies are not limited to commercial activi-

ties, but can be applied to most aspects of life, from personal development to commercial intentions (Bacigalupo et al., 2016). There is a link here to the issues around the types of skills required for the fourth industrial revolution.

We have argued previously that AI and machine learning, for all their capabilities, do have limitations, and these limitations fall around the longer-evolved human abilities that we find the easiest to perform (Moravec, 1988, Rotenberg, 2013, Yao, 2008). AI and machine learning are very good at making predictions through statistical analysis, but these predictions do not consider causal relationships; understanding causal relationships and making judgements about whether to act on those predictions is uniquely human (Agrawal, Gans, and Goldfarb, 2018). AI and machine learning tend to perform tasks that are limited to one part of the brain, whereas in humans most tasks are performed by parts of the brain that are not independent of each other (Lu et al., 2018). In other words, we use multiple parts of our brains at the same time to perform multiple tasks, whereas AI follows a single function. This suggests that the skills that AI and machine learning are unable to replicate are a wide range of non-routine cognitive and manual skills, and these are going to be in demand.

One of the most comprehensive reports has been *The Future of Skills: Employment in 2030* (Bakhshi et al., 2017), which ranked 120 skills in order of importance. The top 20 are included in Table 1.

Table 1: Top 20 skills for 2030

Top 20 skills for 2030	
1. Judgement and decision making	11. Critical thinking
2. Fluency of ideas	12. Instructing
3. Active learning	13. Education and training
4. Learning strategies	14. Managing personnel resources
5. Originality abilities	15. Coordination
6. Systems evaluation	16. Inductive reasoning
7. Deductive reasoning	17. Problem sensitivity
8. Complex problem solving	18. Information ordering
9. Systems analysis	19. Active listening
10. Monitoring	20. Administration and management

*Adapted from The Future of Skills: Employment in 2030 (Bakhshi et al., 2017)*

Most, if not all, of these skills are uniquely human and are not easily replicated by AI or machine learning. As noted previously, AI and machine learning have problems making judgements. This is because judgments are unique to each individual human based on their own life experiences; something that AI and machine learning cannot yet replicate.

There is a correlation between many of the skills that have been determined to be critical for the future and those capabilities that determine competency in enterprising, entrepreneurial, and innovative behaviors. Although many papers have discussed the most critical skills needed for the future, there is precious little information about how competence in those skills might be recognized or measured. Several papers have pointed out this dilemma (Bamber, Bartram, and Stanton, 2017; Hecklau et al., 2016; Neubert et al., 2015).

The Entrepreneurship Competence Framework was developed to provide some consistent structure to the learning outcomes of people studying to improve their enterprising, entrepreneurial, and innovative skills (Bacigalupo et al., 2016). The framework consists of three areas that have five key competencies. These competencies are then mapped out across four specific levels—foundation, intermediate, advanced, and expert—that equate to Levels 1 to 8 within the UK higher education system. Table 2 summarizes the competencies.

*Table 2: Entrepreneurial competencies*

Areas	Entrepreneurial Competencies
Ideas and opportunities	Spotting opportunities; creativity; vision; valuing ideas; ethical and sustainable thinking
Resources	Self-awareness and self-efficacy; motivation and perseverance; mobilizing resources; financial and economic literacy; mobilizing others
Into action	Taking the initiative; planning and management; coping with uncertainty, ambiguity and risk; working with others; learning through experience

*Adapted from The Entrepreneurship Competence Framework (Bacigalupo et al., 2016)*

The Entrepreneurship Competence Framework maps these competencies across a range of fields. For example, the framework sets ideas and opportunities within the use of imagination to create ideas and identify the opportunities these ideas bring. A number of themes then provide the structure for a list of increasingly complex and difficult tasks that assess a person's competency to perform in the four areas as it moves from Level 1 to Level 8.

The link between the skills in Table 1 and the competencies in Table 2 is strong. Table 3 analyzes how the top 20 skills as defined by Bakhshi et al. (2017) and the Entrepreneurship Competence Framework as defined by Bacigalupo et al. (2016) are linked.

*Table 3: Link between skills and entrepreneurial competencies*

Skills	Entrepreneurial Competencies
Judging and decision making	Spotting opportunities; valuing ideas; self-awareness and self-efficacy; taking the initiative; ambiguity, and risk
Fluency of ideas	Creativity; vision; financial and economic literacy; learning through experience
Active learning	Ethical and sustainable thinking; self-awareness and self-efficacy; motivation and perseverance; learning through experience
Learning strategies	Vision; ethical and sustainable thinking; self-awareness and self-efficacy; motivation and perseverance; planning and management; coping with uncertainty,
Original abilities	Creativity; vision; motivation and perseverance; taking the initiative; coping with uncertainty, ambiguity, and risk; working with others; learning through experience
Systems evaluation	Ethical and sustainable thinking; financial and economic literacy; taking the initiative; working with others
Deductive reasoning	Ethical and sustainable thinking; self-awareness and self-efficacy; learning through experience
Complex problem solving	Creativity; vision; valuing ideas; ethical and sustainable thinking; self-awareness and self-efficacy; motivation and perseverance; mobilising resources; financial and economic literacy; taking the initiative; coping with uncertainty, ambiguity, and risk; working with others; learning through experience



Systems analysis	Spotting opportunities; valuing ideas; ethical and sustainable thinking; mobilizing resources; financial and economic literacy; mobilising others; taking the initiative; planning and management; coping with uncertainty, ambiguity, and risk; working with others; learning through experience
Monitoring	Ethical and sustainable thinking; self-awareness and self-efficacy; planning and management; working with others; learning through experience
Critical thinking	Vision; ethical and sustainable thinking; self-awareness and self-efficacy; coping with uncertainty, ambiguity, and risk; learning through experience
Instructing	Vision; ethical and sustainable thinking; motivation and perseverance; mobilizing others; planning and management; working with others; learning through experience
Education and training	Vision; ethical and sustainable thinking; motivation and perseverance; mobilizing others; planning and management; working with others; learning through experience
Managing personal resources	Vision; ethical and sustainable thinking; motivation and perseverance; mobilizing resources; mobilizing others; planning and management; working with others
Coordination	Spotting opportunities; vision; valuing ideas; mobilizing resources; mobilizing others; taking the initiative; planning and management; coping with uncertainty, ambiguity, and risk; working with others
Inductive reasoning	Ethical and sustainable thinking; self-awareness and self-efficacy; coping with uncertainty, ambiguity, and risk; learning through experience
Problem sensitivity	Spotting opportunities; creativity; vision; valuing ideas; financial and economic literacy; coping with uncertainty, ambiguity, and risk; learning through experience
Information ordering	Valuing ideas; ethical and sustainable thinking; valuing ideas; ethical and sustainable thinking; planning and management; working with others; learning through experience
Active listening	Spotting opportunities; ethical and sustainable thinking; self-awareness and self-efficacy; mobilizing others; taking the initiative; planning and management; working with others;
Administration and management	Valuing ideas; ethical and sustainable thinking; mobilizing resources; financial and economic literacy; mobilizing others; planning and management; working with others; learning through experience

*Adapted from The Future of Skills: Employment in 2030 (Bakhshi et al., 2017) and The Entrepreneurship Competence Framework (Bacigalupo et al., 2016)*

It would be both vain and naive of us to claim that Table 3 is a definitive comparison of future skills and entrepreneurial competencies. We acknowledge that this will draw considerable debate. However, the table is drawn from programs run at our respective universities on developing enterprising, entrepreneurial, and innovative skills and abilities. What Table 3 suggests is that the skills required for the future are closely aligned with the competencies that need to be achieved in order to act enterprisingly, entrepreneurially, and innovatively. Furthermore, taking the key points from the QAA definitions, it is evident from Table 3 that most if not all the top 20 skills needed for 2030 can be defined as enterprising, entrepreneurial, or innovative. We therefore argue that enterprising, entrepreneurial, and innovative skills are critical to future employment.

### 3. DISCUSSION AND CONCLUSION

#### 3.1 Implications for human resource management

Although the shortcomings of artificial intelligence and machine learning are becoming evident, much of what we have done in the past around managing labour and capital is becoming obsolete, with managers becoming less certain about what is necessary (Bloom 2018; Martin 2017). Implications for the HRM professional are emerging, and as they do it is becoming evident that the roles of the HRM professional are changing and their ability to match employees with work is becoming more complex. The need to generate economic value through the efficient and effective use of employees (Bondarouk and Brewster, 2016) and the need to retain a competitive edge continues to be of critical importance to all organisations (Nasir, 2017). However, the method of achieving these outcomes is changing and changing rapidly.

Although there is some disagreement, a widely accepted definition of HRM is that it contributes to an organization's strategic approach to achieving its objectives (Florén, Rundquist, and Fischer, 2016; Hecklau et al., 2016; Kidron, Tzafrir, and Meshoulam, 2016; Seeck and Diehl, 2017). The main function of HRM is to develop a workforce that is committed and qualified to undertake the necessary tasks that enable the organization to meet its objectives (Hecklau et al., 2016;

Neubert et al., 2015; Plimmer, Bryson, and Teo, 2017; Seeck and Diehl, 2017). To do this, the general role of HRM professionals is to build competencies, foster collaboration, and contribute to the development of the organization (Hecklau et al., 2016; Paauwe and Boon, 2018; Sammarra et al., 2017). Therefore, it is imperative to recruit, support, and coach employees that can respond to the evolving skills required for the future (Bloom, 2018; Neubert et al., 2015).

As we have indicated, these skills are changing. The classical approach was to recruit people on the basis of the ability to complete routine cognitive and manual tasks (Neubert et al., 2015). The new skills that are emerging, such as originality, complex problem solving, vision, ambiguity, and risk, are tied to the competencies required to act enterprisingly, entrepreneurially, and innovatively. The growing emphasis on creativity and innovation in the workplace, along with the emerging skills required by employers of their employees is questioning traditional ways of thinking about the role of HRM (Bamber, Bartram, and Stanton, 2017; Hecklau et al., 2016). Therefore, as tasks become more non-routine and collaborative, HRM professionals will have to react in a more proactive manner.

HRM professionals have not been customarily at the center of discussions about enterprise, entrepreneurship, and innovation (Bamber, Bartram, and Stanton, 2017). However, the demand for employees who are enterprising, entrepreneurial, and innovative will grow. This means that the HRM professional will need engage in these discussion and develop a broader understanding of the competen-

cies that contribute to enterprising, entrepreneurial, and innovative behaviors, because these behaviors are the key to organizational success.

### 3.2 Conclusion

No one can argue that there will not be a seismic change in the way people work. This paper stimulates discussion about how HRM professionals respond to these changes. It argues that developing a deeper understanding of the competencies required to act enterprisingly, entrepreneurially, and innovatively could be the answer to ensuring that organizations are able to recruit the best person for the job. There is some evidence that successful enterprising, entrepreneurial, and innovative people tend to perform non-routine cognitive and manual tasks better than those without such an approach (Dehghanzadeh, 2016; Koudstaal, Sloof, and Van Praag, 2015). The paper offers a comparison between the predicted skill requirements of the fourth industrial revolution and the competencies required to act enterprisingly, entrepreneurially, and innovatively as evidence of how enterprising, entrepreneurial, and innovative behaviour could be part of the solution to find the most appropriate employees. There is no doubt that future employees need to take on greater tactical, collaborative, and creativity duties. To put this into context, imagine that I have two employees. One comes to me and says, "I have an idea, if we change this, we could save money, or if we do that our customers will be more satisfied." The other employee comes to me and asks, "What shall I do next?" Who am I going to dismiss from my employment?

### SUMMARY IN SLOVENE / IZVLEČEK

V povezavi s četrto industrijsko revolucijo prispevek predlaga enega iz med možnih odzivov na spreminjajoče se načine dela. Natančneje, avtorji predlagajo, da se strokovnjaki osredotočijo na razvijanje globljih in širših razumevanj podjetnega, podjetniškega in inovativnega vedenja na področju človeških virov. Prispevek prikazuje pregled sprememb, ki so se začele pojavljati kot posledica omenjene revolucije, in opisuje, kaj te spremembe pomenijo za zaposlitev. Nadalje prispevek raziskuje spretnosti, ki so ključna za prihodnost in predpostavlja, da je veliko slednjih (če ne celo vseh) mogoče doseči preko pridobivanja kompetenc, ki podjetne, podjetniške in inovativne ljudi naredijo uspešne. Raziskava nenazadnje obravnava tudi posledice za strokovnjake iz področja upravljanja s človeškimi viri in ugotavlja, da je globlje in širše razumevanje podjetnega, podjetniškega in inovativnega vedenja za njih ključnega pomena, saj se narava dela spreminja.

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